



ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – FINAL

Permit Number: AK0053660

Point Thomson Central Pad - Construction Camp #1

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

Public Comment Period Start Date: August 17, 2012

Public Comment Period Expiration Date: September 17, 2012

[Alaska Online Public Notice System](#)

Technical Contact: Gerry R. Brown
Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501
(907) 269-4874
Fax: (907) 334-2415
gerry.brown@alaska.gov

Proposed issuance of an Alaska Pollutant Discharge Elimination System (APDES) permit to

EXXON MOBIL CORPORATION

For wastewater discharges from

Point Thomson Central Pad - Construction Camp #1
Latitude 70.1713, Longitude -146.2568
Eastern North Slope, Alaska

The Alaska Department of Environmental Conservation (the Department or DEC) proposes to issue an APDES individual permit (permit) to Exxon Mobil Corporation (ExxonMobil). The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from the Point Thomson Central Pad – Construction Camp #1 and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of effluent limits and other conditions
- technical material supporting the conditions in the permit
- monitoring requirements in the permit.

Public Comment

After the close of the public comment period and after a public hearing, if applicable, the Department will review the comments received on the draft permit. The Department will respond to the comments received in a draft Response to Comments document that will be made available to the public. If no substantive comments are received during the public notice period, the tentative conditions in the draft permit will become the proposed final permit.

The proposed final permit will be made publicly available for a five-day applicant review. The applicant may request a shortened review period or waive the review period in its entirety. After the close of the proposed final permit review period, the Department will make a final decision regarding permit issuance. A final permit will become effective 30 days after the Department's decision, in accordance with the state's appeals process at 18 AAC 15.185.

The Department will transmit the final permit, fact sheet (amended as appropriate), and the Response to Comments to anyone who provided comments during the public comment period or who requested to be notified of the Department's final decision.

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 15 days after receiving the Department's decision to the Director of the Division of Water at the following address:

Director, Division of Water
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See <http://www.dec.state.ak.us/commish/InformalReviews.htm> for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
Juneau AK, 99811-1800

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See <http://www.dec.state.ak.us/commish/ReviewGuidance.htm> for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, application, and other information are located on the Department's Wastewater Discharge Authorization Program website: <http://www.dec.state.ak.us/water/wwdp/index.htm>.

Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street Anchorage, AK 99501 (907) 269-6285	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 610 University Ave. Fairbanks, AK 99709 (907) 451-2136
---	---

TABLE OF CONTENTS

1.0	APPLICANT	6
2.0	FACILITY INFORMATION	6
2.1	Background	7
3.0	COMPLIANCE HISTORY	8
4.0	EFFLUENT LIMITS AND MONITORING REQUIREMENTS.....	8
4.1	Basis for Permit Effluent Limits	8
4.2	Basis for Effluent and Receiving Water Monitoring	8
4.3	Effluent Limits and Monitoring Requirements	9
4.4	Influent and Effluent Monitoring.....	12
4.5	Whole Effluent Toxicity Monitoring	14
5.0	RECEIVING WATER BODY	15
5.1	Water Quality Standards	15
5.2	Water Quality Status of Receiving Water.....	15
5.3	Mixing Zone Analysis.....	15
6.0	ANTIBACKSLIDING	15
7.0	ANTIDEGRADATION	16
8.0	OTHER PERMIT CONDITIONS	19
8.1	Quality Assurance Project Plan	19
8.2	Operation and Maintenance Plan	19
8.3	Best Management Practices Plan	20
8.4	Standard Conditions.....	20
9.0	OTHER LEGAL REQUIREMENTS	20
9.1	Ocean Discharge Criteria Evaluation.....	20
9.2	Endangered Species Act	21
9.3	Essential Fish Habitat	21
9.4	Sludge (Biosolids) Requirements	22
9.5	Permit Expiration	23
10.0	References.....	24

TABLES

Table 1: Effluent Characteristics for Wastewater Membrane Treatment	7
Table 2: Effluent Characteristics for Drinking Water Treatment Backwash.....	7
Table 3: Outfall 001A and 002A: Discharge from the MBR to Lion Bay - Effluent Limits and Monitoring Requirements	10
Table 4: Outfall 003A: MBR to Unnamed Lake Effluent Limits and Monitoring Requirements.....	11
Table 5: Outfall 001B and 002B: Backwash to Lion Bay Effluent Limits and Monitoring Requirements	12
Table 6: Outfall 003B: Backwash to Unnamed Lake Effluent Limits and Monitoring Requirements	12
Table 7: Additional Monitoring to Support Future Applications for Reissuance.....	14
 Table B-1: BPJ - Secondary Treatment Effluent Limits.....	 29
Table B-2: Selection of pH Permit Limits	33

FIGURES

Figure 1: Point Thomson Central Pad - Construction Camp #1 Map.....	25
Figure 2: Point Thomson Central Pad - Construction Camp #1 Nanofiltration Process Flow Diagram..	26
Figure 3: Point Thomson Central Pad - Construction Camp #1 MBR Process Flow Diagram.....	27

LIST OF APPENDICES

APPENDIX A. FACILITY INFORMATION.....	25
APPENDIX B. BASIS FOR EFFLUENT LIMITS	28
APPENDIX C. REASONABLE POTENTIAL DETERMINATION.....	35
APPENDIX D. EFFLUENT LIMIT CALCULATION	35

1.0 APPLICANT

This fact sheet provides information on the Alaska Pollutant Discharge Elimination System (APDES) permit for the following entity:

Name of Facility:	Point Thomson Central Pad - Construction Camp #1 (CC1)
APDES Permit Number:	AK0053660
Facility Location:	Lion Bay in the Beaufort Sea: Latitude: 70.1713, Longitude: -146.2568
Mailing Address:	P.O. Box 190267, Anchorage, AK 99519
Facility Contact:	Ms. Julie McKim

The map in Appendix A to the Fact Sheet shows the location of the treatment plant and the discharge location.

2.0 FACILITY INFORMATION

The information contained in the permit and this fact sheet is based on information submitted by Exxon Mobil Corporation (ExxonMobil) with their APDES application, comments received during the 10-day applicant review period and other supporting documents. The APDES application encompasses information regarding ExxonMobil's proposed treatment systems, data from similar plants operated on the North Slope and best professional judgment of treatment performance based on the proposed treatment systems. Note, this APDES permit issuance is for new wastewater sources that do not have existing effluent data, or pilot plant data available for permit limit development. Subsequent paragraphs in this section briefly describe the wastewater types that will be generated and the treatment employed prior to wastewater discharge. Flow diagrams on pages 26 and 27 are also provided to schematize the narrative below.

Potable water production will occur at CC1 via tubular membrane nanofiltration of surface water, which will include periodic membrane cleaning. The wastewater from the periodic membrane cleaning (also called industrial wastewater throughout this document) will be neutralized to a pH of 7.0 and transmitted to the domestic wastewater treatment plant prior to discharge. The estimated quantity of neutralized cleaning and flushing solution discharged to the wastewater treatment plant (WWTP) is 3,300 gallons per clean-in-place cycle. Clean-in-place cycles are estimated to occur at approximately six-month intervals.

Concentrate and routine filter flush wastewater (i.e. not the periodic clean-in-place flows as discussed above) generated from potable water production should not contain elevated concentrations of pollutants as it is chiefly composed of the raw water extracted for drinking water (i.e. chemicals have not been introduced to the system). Accordingly, this waste stream is monitored for pollutants that may occur in the raw water source and is subsequently discharged directly to the outfall. The estimated quantity of concentrate and routine filter flush wastewater is 4,675 gallons per day (GPD).

Domestic wastewater from CC1 will be generated and also transmitted to the WWTP for advanced treatment prior to discharge. The WWTP type is a tubular membrane bioreactor, or MBR. MBR's are capable of achieving high quality effluent through the process of micro- or ultrafiltration coupled with biological treatment with a suspended growth bioreactor. On average, wastewater discharge volume from the WWTP will be 18,700 GPD with a maximum daily discharge of 33,000 GPD. All generated wastewater will either be directed to an outfall that discharges at the ocean/shoreline interface or to an unnamed freshwater lake located south of CC1. Outfall extension into Lion Bay was deemed impracticable due to shifting sea ice threatening to damage the outfall line.

Due to the nature of drinking water backwash (comprised of concentrate and routine filter flush in the subject permit) and the high treatment performance of MBRs, per the information included in the APDES application, ExxonMobil expects the discharges discussed above to meet water quality criteria without the need for a mixing zone. Accordingly, the Alaska Department of Environmental Conservation (DEC or the Department) is not authorizing a mixing zone as part of this APDES permitting action.

The Tables 1 and 2 provide estimated effluent characteristics applicable to the discharges covered under this permit.

Table 1: Effluent Characteristics for Wastewater Membrane Treatment

Average Monthly Flow	18,700 GPD
Average Biological Oxygen Demand, 5-day (BOD ₅) Load:	15 milligrams per liter (mg/L)
Average Total Suspended Solids (TSS) Load:	15 mg/L
BOD ₅ Percent Removal:	Greater Than 85 Percent
TSS Percent Removal :	Greater Than 85 Percent
Average Total Residual Chlorine Concentration:	< 100 micrograms per liter (µg/L)
Average Fecal Coliform Bacteria in Colony Forming Units (cfu) per 100 milliliters (mL):	14 cfu/100 mL
Average Winter Temperature in Celsius Units (° C):	7 ° C
Average Summer Temperature:	10 ° C

Table 2: Effluent Characteristics for Drinking Water Treatment Backwash

Average Monthly Flow	4,675 GPD
Average BOD ₅ Concentration:	25 mg/L
Average TSS Concentration:	50 mg/L
Average Total Organic Carbon Concentration:	30 mg/L
Average Total Dissolved Solids (TDS) Concentration:	300 mg/L
Average Winter Temperature:	2 ° C
Average Summer Temperature:	10 ° C
Average Total Residual Chlorine Concentration:	< 100 µg/L

2.1 Background

ExxonMobil is developing hydrocarbon resources at Point Thomson. Historic site activities to date include construction of a 13-acre pad (Central Pad) and exploration activities. In winter 2012, ExxonMobil will begin expanding the Central Pad to a 56-acre pad and begin construction of an initial production system. Construction is expected to last three years and will require three separate construction camps: an initial 32-person camp, a 340-person construction camp, and ultimately a 200-person construction camp that will later become the

long-term 74-person Central Pad operations camp. These camps will be operated independently and be relocated onsite as needed to accommodate systematic expansion of the Central Pad and construction of the initial production system. Each camp will discharge treated wastewater and drinking water backwash through a common outfall. The point of discharge may be to either Lion Bay of the Beaufort Sea or the nearby unnamed freshwater lake as these facilities are relocated to accommodate construction.

The 32-person camp is scheduled to arrive in December 2012 and has an existing authorization number of AKG570069 (under APDES General Permit AKG570000), which has expired, but is operating under administratively extension (i.e. the authorization continues to be in effect and enforceable) until such time as DEC reissues the permit. The 340-person construction camp is also expected to arrive at the Central Pad during the early winter of 2012 and is anticipated to be operated until approximately 2016. The 200-person construction camp that will be reduced to approximately 74 people at a future time is anticipated to begin operation in 2013 and does not require permit coverage at this time. Because the 32-person camp currently has APDES permit coverage, and permit coverage for the 200-person camp will be processed as a separate action, this subject permit only covers the 340-person camp and potential discharges to marine outfalls 001 or 002 (depending on the final configuration of the Central Pad and the outfall's final location) or the freshwater lake, outfall 003. Depending on the Central Pad's final configuration, discharge may occur to different outfalls to differing receiving water body types (i.e. fresh or marine water). This has necessitated that several effluent limit and monitoring requirement tables be generated in order to facilitate construction flexibility and accommodate the differing effluent limits derived from State water quality criteria that is based on receiving water body type.

3.0 COMPLIANCE HISTORY

This is a new facility, and no compliance history is available at this time.

4.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

4.1 Basis for Permit Effluent Limits

The Clean Water Act (CWA) requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based effluent limits. A technology-based effluent limit is set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards (WQS) of a water body are met. Water quality-based effluent limits may be more stringent than technology-based effluent limits. The basis for the proposed effluent limits in the permit is further detailed in Appendix B of this fact sheet.

4.2 Basis for Effluent and Receiving Water Monitoring

In accordance with Alaska Statute (AS) 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. Monitoring in a permit is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and receiving water data to determine if additional effluent limits are required

and/or to monitor effluent impact on receiving water body quality. For example, since only estimated temperature data was provided for the treatment types above in Tables 1 and 2, the Department has determined that temperature monitoring is necessary during the permit cycle to gather data to evaluate whether temperature is a pollutant of concern.

4.3 Effluent Limits and Monitoring Requirements

The permit contains limits that are both technology-based and water quality-based. The following tables summarize the effluent limits and monitoring requirements (see Appendices B through D for more technical details). Tables 3 and 4 list the effluent limits and monitoring requirements for the discharge that passes through the MBR treatment system. Table 3 contains the requirements if the discharge is directed to Lion Bay; whereas, Table 4 contains the requirements if the discharge is directed to the unnamed freshwater lake. Tables 5 and 6 list the effluent limits and monitoring requirements for the concentrate and routine filter flush that is directed to the outfall. Table 5 contains the requirements if the discharge is directed to Lion Bay; whereas, Table 6 contains the requirements if the discharge is directed to the unnamed freshwater lake. Samples must be taken after the last treatment train and prior to discharge into the receiving water.

Table 3: Outfall 001A or 002A: Discharge from the MBR to Lion Bay - Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Minimum	Monthly Average	Weekly Average	Daily Maximum	Units	Sample Location	Sample Frequency	Sample Type
Total Discharge Flow	N/A	0.0187 ^a	N/A	0.033	MGD	Effluent	Continuous	Recorded
BOD ₅	N/A	30	45	60	mg/L	Effluent	1/Month	Grab
	N/A	4.7	7.0	9.4	(pounds per day) lb/day			
BOD ₅	N/A	Report	N/A	N/A	mg/L	Influent	1/Month	Grab
BOD ₅ Percent Removal	85	N/A	N/A	N/A	Percent	Influent/Effluent	1/Month	Grab
TSS	N/A	30	45	60	mg/L	Effluent	1/Month	Grab
	N/A	4.7	7.0	9.4	lb/day			
TSS	N/A	Report	N/A	N/A	mg/L	Influent	1/Month	Grab
TSS Percent Removal	N/A	85 (minimum)	N/A	N/A	Percent	Influent/Effluent	1/Month	Grab
Fecal Coliform Bacteria	N/A	14 ^b	N/A	43 ^b	Most Probable Number (MPN)	Effluent	1/Week	Grab
Enterococci	N/A	N/A	N/A	Report	#/100 mL	Effluent	1/Month ^c	Grab
pH	6.5	N/A	N/A	8.5	Standard Units (SU)	Effluent	3/Week	Grab
Dissolved Oxygen	6.0	N/A	N/A	17	mg/L	Effluent	3/Week	Grab
Total Residual Chlorine ^d	N/A	7.5	N/A	13	µg/L	Effluent	1/Month ^e	Grab

Notes:

- The wastewater discharge volume shall not exceed the maximum hydraulic design flow rate approved in the Final Approval to Operate issued by the Department. Final Approval to Operate means that the Department has reviewed and approved the wastewater treatment works engineered plans submitted to the Department in accordance with 18 AAC 72.210 through 18 AAC 72.285 or as amended.
- In a 30-day period, the median most probable number (MPN) may not exceed 14 FC/100 mL and not more than 10 percent of samples may exceed 43 FC/100 mL.
- Enterococci bacteria monitoring is required May – September for marine discharges only.
- Effluent limits for Total Residual Chlorine (TRC) are not quantifiable using EPA-approved analytical methods. DEC will use the minimum detection limit of 0.1 mg/L as the compliance level for this parameter.
- During months when membrane cleaning takes place, TRC monitoring must be conducted coincident with cleaning activities.

Table 4: Outfall 003A: Discharge from MBR to Unnamed Lake - Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Minimum	Monthly Average	Weekly Average	Daily Maximum	Units	Sample Location	Sample Frequency	Sample Type
Total Discharge Flow	N/A	0.0187 ^a	N/A	0.033	MGD	Effluent	Continuous	Recorded
BOD ₅	N/A	30	45	60	mg/L	Effluent	1/Month	Grab
	N/A	4.7	7.0	9.4	lb/day			
BOD ₅	N/A	Report	N/A	N/A	mg/L	Influent	1/Month	Grab
BOD ₅ Percent Removal	N/A	85	N/A	N/A	Percent	Influent/Effluent	1/Month	Grab
TSS	N/A	30	45	60	mg/L	Effluent	1/Month	Grab
	N/A	4.7	7.0	9.4	lb/day			
TSS	N/A	Report	N/A	N/A	mg/L	Influent	1/Month	Grab
TSS Percent Removal	85	N/A	N/A	N/A	Percent	Influent/Effluent	1/Month	Grab
Fecal Coliform Bacteria	N/A	20 ^b	N/A	40 ^b	MPN	Effluent	1/Week	Grab
pH	6.5	N/A	N/A	8.5	SU	Effluent	3/Week	Grab
Dissolved Oxygen	7.0	N/A	N/A	17	mg/L	Effluent	3/Week	Grab
Total Residual Chlorine ^c	N/A	11	N/A	19	µg/L	Effluent	1/Month ^d	Recorded

Notes:

- The wastewater discharge volume shall not exceed the maximum hydraulic design flow rate approved in the Final Approval to Operate issued by the Department. Final Approval to Operate means that the Department has reviewed and approved the wastewater treatment works engineered plans submitted to the Department in accordance with 18 AAC 72.210 through 18 AAC 72.285 or as amended.
- In a 30-day period, the geometric mean may not exceed 20 FC/100 mL and not more than 10 percent of samples may exceed 40 FC/100 mL.
- Effluent limits for TRC are not quantifiable using EPA-approved analytical methods. DEC will use the minimum detection limit of 0.1 mg/L as the compliance level for this parameter.
- During months when membrane cleaning takes place, TRC monitoring must be conducted coincident with cleaning activities.

Table 5: Outfall 001B or 002B: Discharge of Backwash to Lion Bay - Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Units	Sample Location	Sample Frequency	Sample Type
Total Discharge Flow	N/A	Report	N/A	Report	MGD	Effluent	Continuous	Recorded
TSS	N/A	30	N/A	60	mg/L	Effluent	1/Month	Grab
pH	6.5	N/A	N/A	8.5	SU	Effluent	1/Month	Grab
Total Residual Chlorine ^a	N/A	7.5	N/A	N/A	µg/L	Effluent	1/Month	Recorded
Notes:								
a. Chlorine monitoring is only required to occur if chlorine is introduced to the system. The effluent limit for TRC is not quantifiable using EPA-approved analytical methods. Therefore, DEC will use the minimum detection limit of 0.1 mg/L as the compliance level for this parameter, if needed.								

Table 6: Outfall 003B: Discharge of Backwash to Unnamed Lake Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Units	Sample Location	Sample Frequency	Sample Type
Total Discharge Flow	N/A	Report	N/A	Report	MGD	Effluent	Continuous	Recorded
TSS	N/A	30	N/A	60	mg/L	Effluent	1/Month	Grab
pH	6.5	N/A	N/A	8.5	SU	Effluent	1/Month	Grab
Total Dissolved Solids (TDS)	N/A	N/A	N/A	500	mg/L	Effluent	1/quarter	Grab
Total Residual Chlorine ^a	N/A	11	N/A	N/A	µg/L	Effluent	1/Month	Recorded
Notes:								
a. Chlorine monitoring is only required to occur if chlorine is introduced to the system. The effluent limit for TRC is not quantifiable using EPA-approved analytical methods. Therefore, DEC will use the minimum detection limit of 0.1 mg/L as the compliance level for this parameter, if needed.								

4.4 Influent and Effluent Monitoring

MBR Routine Monitoring. The permit requires monitoring of the effluent for flow, BOD₅, TSS, fecal coliform bacteria, pH, dissolved oxygen and total residual chlorine to determine compliance with the effluent limits. The permit also requires monitoring of the influent for BOD₅ and TSS to calculate monthly percent removal rates for these parameters.

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the sampling necessary to adequately monitor the facility's performance. These are minimum sampling frequencies. The permittee has the option of taking more frequent samples than the minimum required under the permit. These additional samples must be used for averaging if they are conducted using Department – approved test methods (generally found in 18 AAC 70 and 40 CFR Part 136 [adopted by reference in 18 AAC 83.010]), and if the Method Detection Limits (MDLs) are less than the effluent limits.

Nanofilter Backwash (Concentrate and Routine Filter Flush) Routine Monitoring. The permit requires monitoring of the concentrate and routine filter flush discharged to the receiving water from the nanofiltration drinking water treatment system. The routine parameters include pH, TSS, TDS (freshwater only), and total residual chlorine if used in the raw water upstream of the treatment system. Monitoring frequencies are based on the nature and effect of the pollutants and are considered minimum requirements. The permittee may opt to sample more frequently to assess operational modifications or obtain average concentrations as previously discussed for the MBR discharge.

MBR Additional Monitoring. The permittee shall perform additional effluent monitoring throughout the permit cycle to collect data to further characterize the chemistry of the wastestream and support future APDES applications for permit reissuance (see Table 7). The permittee shall submit the results of this additional monitoring with application for APDES permit reissuance.

Additional Nanofilter Backwash (Concentrate and Routine Filter Flush) Monitoring. The permittee shall perform additional effluent monitoring during the permit cycle to collect data to further characterize the chemistry of the wastestream as well as support future APDES applications for permit reissuance (see Table 7). The permittee shall submit the results of this additional monitoring with application for APDES permit reissuance. Typical effluent characteristics for drinking water wastewater are not well established at this time and are often source water dependent. Therefore, the list of analytes is intended to encompass a large range of potential parameters of concern.

Table 7 provides the parameters that must be monitored for permit reissuance. The monitoring frequency for all parameters listed in Table 7 is semi-annual during the life of the permit with one sample collected between June 1 and September 1 and one sample collected between October 1 and May 1. Samples must be taken after the last treatment train and prior to discharge into the receiving water. Note samples routinely monitored and reported on monthly discharge monitoring reports (DMR) may be used to complete the monitoring requirements outlined in Table 7, as appropriate.

Table 7: Additional Monitoring to Support Future Applications for Reissuance

Parameter	MBR Discharge	Nanofilter Discharge	Sample if Discharge is to Marine Water	Sample if Discharge is to Fresh Water	Units	Sample Type
Fecal Coliform Bacteria	DMR	Yes	Yes	Yes	FC#/100 mL	Grab
Enterococci	DMR	Yes	Yes	Yes	#/100 mL	Grab
TDS	Yes	DMR	No	Yes	mg/L	Grab
Turbidity	No	Yes	Yes	Yes	NTU	Grab
Hardness as Calcium Carbonate (CaCO ₃)	Yes	Yes	No	Yes	mg/L as CaCO ₃	Grab
Alkalinity as CaCO ₃	Yes	Yes	Yes	Yes	mg/L as CaCO ₃	Grab
D.O.	DMR	Yes	Yes	Yes	mg/L	Grab
Temperature	Yes	Yes	Yes	Yes	°C	Grab
pH ^a	DMR	DMR	Yes	Yes	SU	Grab
Salinity ^a	Yes	Yes	Yes	No	parts per thousand (ppt)	Grab
Copper ^b	Yes	Yes	Yes	Yes	µg/L	Grab
Lead ^b	Yes	Yes	Yes	Yes	µg/L	Grab
Zinc ^b	Yes	Yes	Yes	Yes	µg/L	Grab
Iron ^b	Yes	Yes	Yes	Yes	µg/L	Grab
Manganese ^b	No	Yes	Yes	Yes	µg/L	Grab
Mercury ^b	Yes	Yes	Yes	Yes	µg/L	Grab
Arsenic ^b	Yes	Yes	Yes	Yes	µg/L	Grab
Total Chloride	Yes	Yes	No	Yes	mg/L	Grab
Sulfates	Yes	Yes	No	Yes	mg/L	Grab
Notes:						
a. Temperature and pH are required to be measured concurrently with salinity samples.						
b. Metals shall be analyzed and reported as total recoverable.						

4.5 Whole Effluent Toxicity Monitoring

18 AAC 83.435 requires that a permit contain limitations on whole effluent toxicity (WET) when a discharge has reasonable potential to cause or contribute to an exceedance of a WQS. Because the discharges from CC1 are expected to meet water quality criteria at the end of pipe, the Department has determined that it is highly unlikely reasonable potential exists for the effluent to exceed WQS, including WET. Accordingly, WET testing is not required at this time. However, note the Department has established effluent limits and monitoring requirements for other specific “indicator” pollutants (e.g. TRC and total dissolved solids) to evaluate pollutants associated with these wastestreams that have the highest likelihood of imparting toxicity.

5.0 RECEIVING WATER BODY

5.1 Water Quality Standards

Regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the WQS. The State's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each water body.

Water bodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some water bodies in Alaska can also have site-specific water quality criteria per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b). The Department has determined that there has been no reclassification of the subject receiving water bodies (marine or freshwater) for this permit nor has site-specific water quality criteria been established. Furthermore, all discharges must be protective of all uses in 18 AAC 70.020(a).

5.2 Water Quality Status of Receiving Water

Any part of a water body for which the water quality does not or is not expected to meet applicable WQS is defined as a "water quality limited segment" and placed on the State's impaired water body list.

Section 303(d) of the CWA requires states to develop a Total Maximum Daily Load (TMDL) management plan for a water body determined to be water quality limited. The TMDL documents the amount of a pollutant a water body can assimilate without violating a state's WQS and allocates that load to known point sources and nonpoint sources.

Neither Lion Bay of the Beaufort Sea nor the unnamed lake are included on the *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*, July 15, 2010 as an impaired water body nor are the subject water bodies listed as a CWA §303(d) water body requiring a TMDL.

5.3 Mixing Zone Analysis

The backwash from the nanofiltration system and the MBR discharge are expected to meet water quality criteria at the end of pipe. Based on the high-quality effluent anticipated to be discharge to the receiving water, no mixing zone has been requested by the applicant or is authorized by DEC in this permit.

6.0 ANTIBACKSLIDING

18 AAC 83.480 requires that "effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit." 18 AAC 83.480(c) also states that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued." This facility is a new source and this is the initial APDES permit for this facility's discharge; therefore, antibacksliding provisions are not applicable.

7.0 ANTIDegradation

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. The Antidegradation Policy of the WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. This section analyzes and provides rationale for the Department's decisions in the permit issuance with respect to the Antidegradation Policy.

The Department's approach to implementing the Antidegradation Policy, found in 18 AAC 70.015, is based on the requirements in 18 AAC 70 and the Department's *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*, dated July 14, 2010. Using these procedures and policy, the Department determines whether a water body, or portion of a water body, is classified as Tier 1, Tier 2, or Tier 3, where a higher numbered tier indicates a greater level of water quality protection. At this time, no Tier 3 waters have been designated in Alaska. Lion Bay is not listed as impaired on DEC's most recent *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*; therefore, a Tier 1 designation is not warranted. In addition, little other baseline receiving water data exists. Accordingly, this antidegradation analysis conservatively assumes that the discharge is to a Tier 2 water body.

The State's Antidegradation Policy in 18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water (i.e. Tier 2 waters), that quality must be maintained and protected. The Department may allow a reduction of water quality only after finding that five specific requirements of the antidegradation policy at 18 AAC 70.015(a)(2)(A)-(E) are met. The Department's findings follow:

1. **18 AAC 70.015(a)(2)(A).** Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.

Issuance of this permit will allow ExxonMobil to begin expansion of their Central Pad in preparation for anticipated large-scale hydrocarbon production in the 2015-2016 timeframe. Part of the Central Pad expansion includes plans for eventual construction of an underground injection control (UIC) well to dispose of wastes generated onsite, including the waste streams authorized by this permit. Until the UIC well is successfully operational, ExxonMobil requested that the wastewater generated onsite be treated and discharged to surface water. This discharge will result in the localized lowering of water quality.

The Final Point Thomson Environmental Impact Statement (EIS) indicates the multiyear project will create thousands of employment opportunities associated with the project. Employment will be available for activities associated with construction, drilling, and operations. Overall project employment has been extrapolated over 30 years with employment peaking in year five of the project with approximately 1,100 employment opportunities available. This influx of workers will have a positive impact on the local tax base. For example, the addition of 1,000 construction workers to the total population of the North Slope Borough (NSB) could result in a 6.5 percent increase in the total NSB operating budget relative to the fiscal year 2009 budget values.

The EIS also states that the applicant (i.e. ExxonMobil) has committed to hiring local residents and Alaska Natives for construction jobs, and sponsored a job fair in Kaktovik in 2009 and 2010 with plans to conduct it routinely. In addition, during the exploratory phase of the Point Thomson Project, which took place from 2008 through 2011, several North Slope native

corporations, including the Arctic Slope Regional Corporation, Kaktovik Inupiat Corporation, and Kuukpik Corporation were among the largest contractors when evaluated by revenues earned. These local and regional Native corporations, in turn, pay dividends to North Slope residents that are Native shareholders.

The APDES application indicates that as operator of the Point Thomson Unit (Unit), ExxonMobil is proposing to develop hydrocarbon resources of the Unit. ExxonMobil specifically intends to: produce natural gas and liquid condensate from the Thomson Sand reservoir, recover liquid condensate, re-inject the residual gas back into the reservoir, and transport the condensate by pipeline for delivery to the Trans Alaska Pipeline System. The APDES application also discusses the mobilization of several hundred people to assist with construction and ongoing operation of the Central Pad over the next several years.

According to the Alaska Department of Natural Resources State Pipeline Coordinator's Office webpage, the Point Thomson oil and gas field holds an estimated eight trillion cubic feet of natural gas and 200 million barrels of condensates. The Resource Development Council for Alaska, Inc.'s webpage (a statewide business association comprised of individuals and companies from Alaska's oil and gas, mining, forest products, tourism and fisheries industries) indicates that leaseholders have spent over \$800 million on the project overall and plan on spending an additional \$1.3 billion to bring the field into development.

The Department concludes that the operation of the WWTP and the authorization of the discharge accommodate the important economic and social development of the State of Alaska and its citizens and that this finding is satisfied.

2. **18 AAC 70.015(a)(2)(B).** Except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.

Discharge allowed by the permit conforms to the requirements of 18 AAC 70.020. No water quality variance in the form of a mixing zone is authorized and all water quality criteria will be met at the end of pipe prior to discharge. Site-specific criteria as allowed by 18 AAC 70.235 has not been established for either Lion Bay or the unnamed freshwater lake and is therefore not applicable. Also, it is not anticipated that the low-volume discharge is toxic, so reducing water quality is not expected to violate the whole effluent toxicity limit in 18 AAC 70.030. The Department concludes that the reduced water quality will not violate the applicable criteria specified in 18 AAC 70.015 (a)(2)(B) and that the finding is satisfied.

3. **18 AAC 70.015(a)(2)(C).** The resulting water quality will be adequate to fully protect existing uses of the water.

The WQS, upon which the permit effluent limits are based, serve the specific purposes of protecting the existing uses of the water. Accordingly, the permit effluent limits restricting the discharge mandate that water quality criteria must not be exceeded at the end of pipe prior to discharge. The Department concludes that the resulting water quality will be adequate to fully protect existing uses and that the finding is satisfied.

4. **18 AAC 70.015(a)(2)(D).** The methods of pollution prevention, control, and treatment found by the Department to be most effective and reasonable will be applied to all wastes and other substances to be discharged.

The Department finds the most effective and reasonable methods of prevention, control, and treatment are the practices and requirements set out in the APDES permit. This type of treatment (e.g. biological treatment) and associated discharge is similar in nature to other like facilities and their discharges located throughout the United States, including the North Slope of Alaska. Moreover, when optimally operated, MBR treatment technologies are capable of achieving higher quality wastewater effluent than traditional secondary biological treatment plants utilizing conventional extended aeration and/or activated sludge processes alone.

In addition, and as previously mentioned, ExxonMobil currently has long-term plans for construction of a UIC well, which will allow for deep subsurface disposal of the wastes discussed herein, thus, eliminating the need for a surface water discharge. However, the construction of the Central Pad and the UIC well require the staging of workers to complete. Accordingly, the wastes generated from the workers staged at the Central Pad must be treated and disposed of in an alternate manner until the UIC is operational.

The permittee is also required to develop and implement a Quality Assurance Project Plan (QAPP) and a Best Management Practices (BMP) Plan developed to guide the permittee on proper monitoring protocols and best waste management practices.

Given employment of an advanced wastewater treatment technology (i.e. MBR) to meet water quality criteria prior to discharge; the long-term plans of the permittee to increase pollution prevention, control, and treatment at the site via a UIC well; and the implementation of the Plans discussed above, the Department concludes that the most effective and reasonable methods of pollution prevention, control, and treatment will be applied and that the finding is satisfied.

5. **18 AAC 70.015(a)(2)(E).** All wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements; and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.

The applicable “highest statutory and regulatory treatment requirements” are defined in 18 AAC 70.990(30) (as amended June 26, 2003) and in the July 14, 2010, DEC guidance titled *Interim Antidegradation Implementation Methods*. Accordingly, there are three parts to the definition, which are:

- (A) any federal technology-based effluent limitation guidelines (ELG) identified in 40 CFR § 125.3 and 40 CFR §122.29, as amended through August 15, 1997, adopted by reference;
- (B) minimum treatment standards in 18 AAC 72.040; and
- (C) any treatment requirements imposed under another state law that is more stringent than a requirement of this chapter.

The first part of the definition includes all federal technology-based ELGs. Upon Department review, no federal technology-based ELGs directly apply to these types of discharges; however, per 40 CFR §125.3(c)(2), the Department is also using best professional judgment (BPJ) under section 402(a)(1) of the CWA to implement case-by-case technology-based secondary treatment requirements for non-POTWs (i.e. privately-owned treatment facilities) authorized to discharge domestic wastewater under this permit. The Department has also implemented a case-by-case

technology-based effluent limit for TSS for the industrial wastewater component. See Appendix B for additional technical and legal information regarding these case-by-case ELGs.

The second part of the definition 18 AAC 70.990(30)(B) (2003) appears to be in error, as 18 AAC 72.040 describes discharges to sewers and not minimum treatment. The correct reference appears to be the minimum treatment standards found at 18 AAC 72.050, which refers to domestic wastewater discharges only. The authorized domestic wastewater discharge is in compliance with the minimum treatment standards found in 18 AAC 72.050 as reflected by the permit limits specifying secondary treatment standards.

The third part of the definition includes any more stringent treatment required by state law, including 18 AAC 70 and 18 AAC 72. The correct operation of equipment, visual monitoring, and implementing BMPs, as well as other permit requirements, will control the discharge and satisfy all applicable federal and state requirements. The Department concludes that all wastes and other substances discharged will be treated and controlled to achieve the highest statutory and regulatory requirements and finds that this requirement is met.

8.0 OTHER PERMIT CONDITIONS

8.1 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to update the Quality Assurance Project Plan (QAPP) within 120 days of the effective date of the final permit. Additionally, the permittee must submit a letter to the Department within 120 days of the effective date of the permit stating that the QAPP has been implemented within the required time frame. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; and data reporting. The plan shall be retained on site and made available to the Department upon request.

8.2 Operation and Maintenance Plan

The permit requires the permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limitations, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop or update and implement an operation and maintenance plan for its facility within 180 days of the effective date of the final permit. If an Operation and Maintenance Plan has already been developed and implemented, the permittee need only to review the existing plan to make sure it is up to date and all necessary revisions are made. The plan shall be retained on site and made available to the Department upon request.

8.3 Best Management Practices Plan

In accordance with AS 46.03.110 (d), the Department may specify in a permit the terms and conditions under which waste material may be disposed of. This permit requires the permittee to develop a Best Management Practices (BMP) Plan in order to prevent or minimize the potential for the release of pollutants to waters and lands of the United States located in the State of Alaska through plant site runoff, spillage or leaks, or erosion. The permit contains

certain BMP conditions that must be included in the BMP Plan. The permit requires the permittee to develop or update and implement a BMP Plan within 180 days of the effective date of the final permit. The BMP Plan must be kept on site and made available to the Department upon request.

8.4 Standard Conditions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

9.0 OTHER LEGAL REQUIREMENTS

9.1 Ocean Discharge Criteria Evaluation

The Ocean Discharge Criteria specifically establish guidelines for permitting discharges into the territorial seas, the contiguous zone, and the ocean. An Ocean Discharge Criteria Evaluation (ODCE) is required to be completed for a point source discharge that occurs beyond the baseline of the territorial sea. Upon review of applicable National Oceanic and Atmospheric Administration (NOAA) nautical charts, DEC determined that discharges to Lion Bay will occur seaward of the closing baseline and that an ODCE is necessary.

Statewide ODCEs were recently completed as part of permit development for general permits AKG572000 – Small Publicly Owned Treatment Works and other Small Treatment Works Providing Secondary Treatment of Domestic Wastewater and Discharging to Surface Water and AKG380000 – Wastewater Discharges from Drinking Water Treatment Facilities. The aforementioned ODCEs covered the type of wastewater discharges covered by this individual permit and therefore are acceptable for use for this permitting action.

The ODCEs were conducted using criteria established in accordance with CWA Section 403 and 40 CFR Part 125. Based on the available information, DEC determines whether the discharge will cause unreasonable degradation of the environment. 40 CFR §125.11, adopted by reference at 18 AAC 83.010(c)(8), states unreasonable degradation means:

- Significant adverse changes in ecosystem diversity, productivity, and stability of the biological community within the area of the area of discharge and surrounding biological communities;
- Threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms; or
- Loss of aesthetic, recreational, scientific or economic values, which is unreasonable in relation to the benefit derived from the discharge.

40 CFR §125.122, adopted by reference at 18 AAC 83.010(c)(8), provides 10 criteria to consider in the determination of whether there is unreasonable degradation or irreparable harm. The 10 criteria include: the amount and nature of the pollutants; the potential transport of the pollutants; the character and uses of the receiving water and its biological communities; the

importance of the receiving water area; the existence of special aquatic sites (including parks, refuges, etc.); any applicable requirements of an approved Coastal Zone Management plan; and potential impacts on water quality, ecological health, and human health.

After careful consideration of the aforementioned 10 criteria, DEC determined that discharges authorized by the general permits and discharged in accordance with the requirements of the permit are unlikely to cause unreasonable degradation of the ocean environment. As previously mentioned, the CC1 discharges covered by this permitting action are characteristically identical (e.g. relatively low discharge volumes, same type of wastewater stream, etc.) to the ones evaluated in the ODCs for the two previously mentioned general permits and are therefore applicable to this permitting action. Further, the high level of treatment employed at the facility further reduces the likelihood of unreasonable degradation. In addition, a mixing zone has not been requested by the applicant or authorized by DEC for this permitting action. Accordingly, State WQS will be met at the end of pipe prior to discharge to Lion Bay. In summary, due to the size and nature of the discharge and compliance with WQS, unreasonable degradation should not occur when facilities are operating under the terms and conditions of the permit.

9.2 Endangered Species Act

The Endangered Species Act requires federal agencies to consult with NOAA's National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions; however, DEC voluntarily contacted the agencies to notify them of this permit issuance and to obtain listings of threatened and endangered species near the proposed discharge. The two bullets below provide the listings of threatened and endangered species and any federally designated critical habitats that both USFWS and NMFS identified that may potentially occur in the discharge area:

- In an e-mail from Ted Swem dated July 10, 2012, USFWS identified endangered species spectacled eiders and polar bears as potentially occurring within the project area. USFWS also identified threatened species Steller's eiders as having habitat in the area. Candidate species in the area also include the yellow-billed loons and the Pacific walrus. Critical habitat for polar bear has also been designated.
- In an e-mail from Kate Savage dated July 12, 2012, NMFS identified the bowhead whale as an endangered species potentially occurring within the project area. Proposed species are the ringed and bearded seals, which also may occur in coastal areas of the Beaufort Sea. NMFS has not designated critical habitat for the aforementioned species or any other NMFS species in the area.

9.3 Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with NOAA when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. As a state agency, DEC is not required to consult with federal agencies regarding permitting actions however, DEC

voluntarily contacted NMFS to notify them of this permit issuance and to obtain listings of EFH near the subject discharge.

In an e-mail from Jeanne Hanson dated July 10, 2012, NMFS provided a letter as an attachment that NMFS provided to the U.S. Army Corps of Engineers regarding EFH Consultation for the Point Thomson project. From that letter, DEC gleaned that the following species have been identified as having EFH in the Arctic Ocean: snow crab, saffron cod, Arctic cod, and all five species of Pacific salmon (chinook, chum, coho, pink, and sockeye). Freshwater EFH has also been designated for pink and chum salmon for the Canning/Staines, Kavik/Shaviovik, and Sagavanirktok Rivers; however, the freshwater discharge location authorized by this permit does not occur in any of these water bodies.

9.4 Sludge (Biosolids) Requirements

Sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. State and federal requirements regulate the management and disposal of sewage sludge (biosolids). The permittee must consult both state and federal regulations to ensure proper management of the biosolids and compliance with applicable requirements.

9.4.1 State Requirements

The Department separates wastewater and biosolids permitting. The permittee should contact the Department's Solid Waste Program for information regarding state regulations for biosolids. The permittee can access the Department's [Solid Waste Program web page](#) for more information and who to contact.

9.4.2 Federal Requirements

EPA is the permitting authority for the federal sewage sludge regulations at 40 CFR Part 503. Biosolids management and disposal activities are subject to the federal requirements in Part 503. The Part 503 regulations are self-implementing, which means that a permittee must comply with the regulations even if no federal biosolids permit has been issued for the facility.

The permittee should ensure that a biosolids permit application has been submitted to EPA. In addition, the permittee is required to submit a biosolids permit application to EPA for the use or disposal of sewage sludge at least 180 days before this APDES permit expires in accordance with 40 CFR §§122.21(c)(2) and 122.21(q) [see also 18 AAC 83.110(c) and 18 AAC 83.310, respectively]. The application form is NPDES Form 2S and can be found on EPA's website, www.epa.gov, under NPDES forms. A completed NPDES Form 2S should be submitted to:

U.S. Environmental Protection Agency, Region 10, NPDES Permits Unit OWW-130, Attention: Biosolids Contact, 1200 Sixth Avenue, Suite 900, Seattle, WA 98101-3140. The EPA Region 10 telephone number is 1-800-424-4372.

Information about EPA's biosolids program and CWA Part 503 is available at www.epa.gov and either search for 'biosolids' or go to the EPA Region 10 website link and search for 'NPDES Permits'.

9.5 Permit Expiration

The permit will expire five years from the effective date of the permit.

10.0 References

1. Alaska Department of Environmental Conservation, 2003. *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*, as amended through December 12, 2008.
2. Alaska Department of Environmental Conservation, 2010. *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*
3. Alaska Department of Environmental Conservation, 2010. *Interim Antidegradation Implementation Methods*. Retrieved from http://www.dec.state.ak.us/water/wqsar/Antidegradation/docs/P&P-Interim_Antidegradation_Implementenation_Methods.pdf
4. National Marine Fisheries Service (NMFS). *Email correspondence*. July 10 & July 12, 2012.
5. U.S. Environmental Protection Agency, 1987. *Model Permit Package for the Water Supply Industry*. Developed by SAIC through EPA Contract No. 68-01-7043.
6. U.S. Environmental Protection Agency. 1991. *Technical Support Document for Water Quality-based Toxics Control*. Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington DC, March 1991. EPA/505/2-90-001.
7. U.S. Fish and Wildlife Service (USFWS), Endangered Species Program, 2012. *Email correspondence*. July 10, 2012.

APPENDIX A. FACILITY INFORMATION

Figure 1: Point Thomson Central Pad - Construction Camp #1 Map

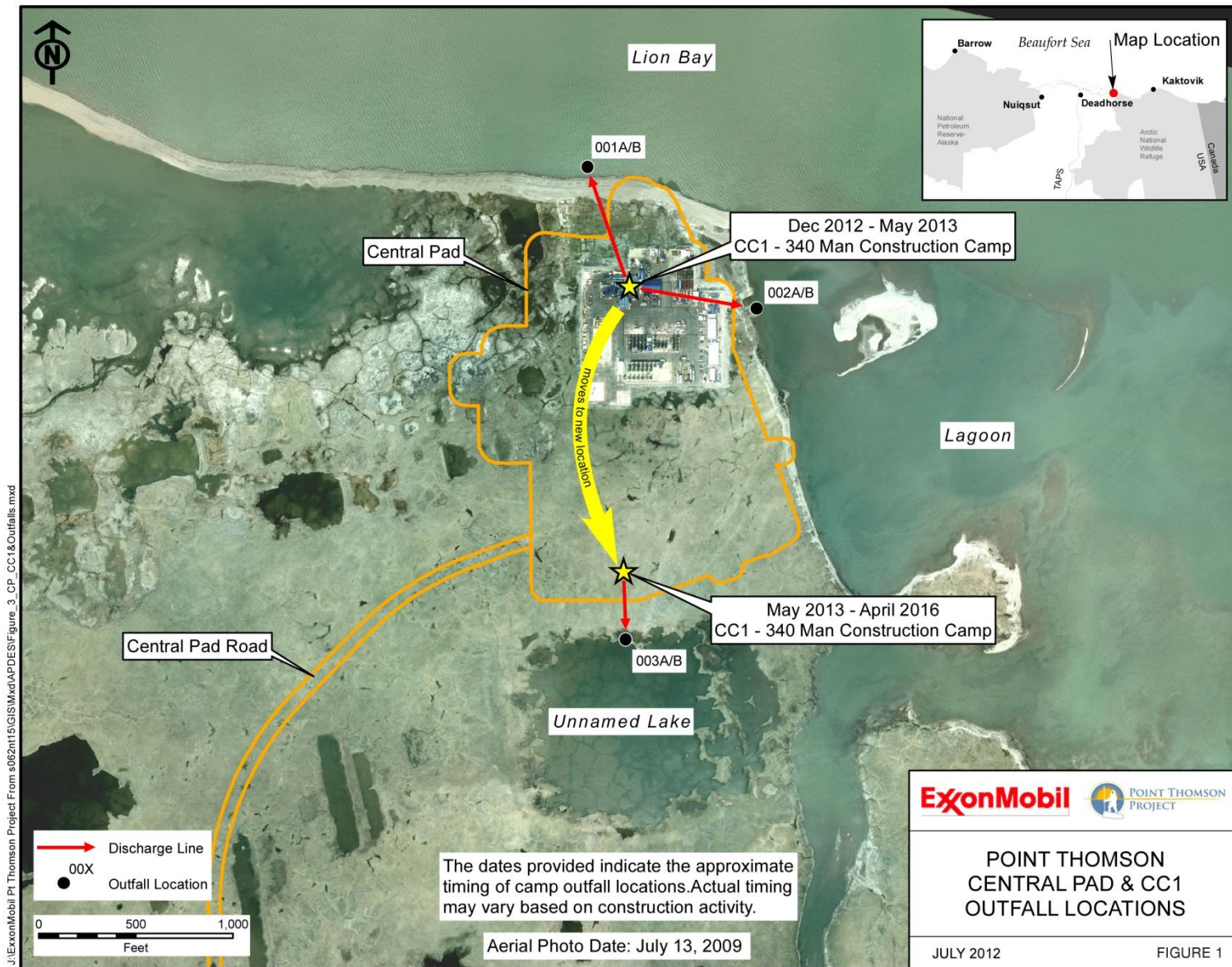


Figure 2: Point Thomson Central Pad - Construction Camp #1 Nanofiltration Process Flow Diagram

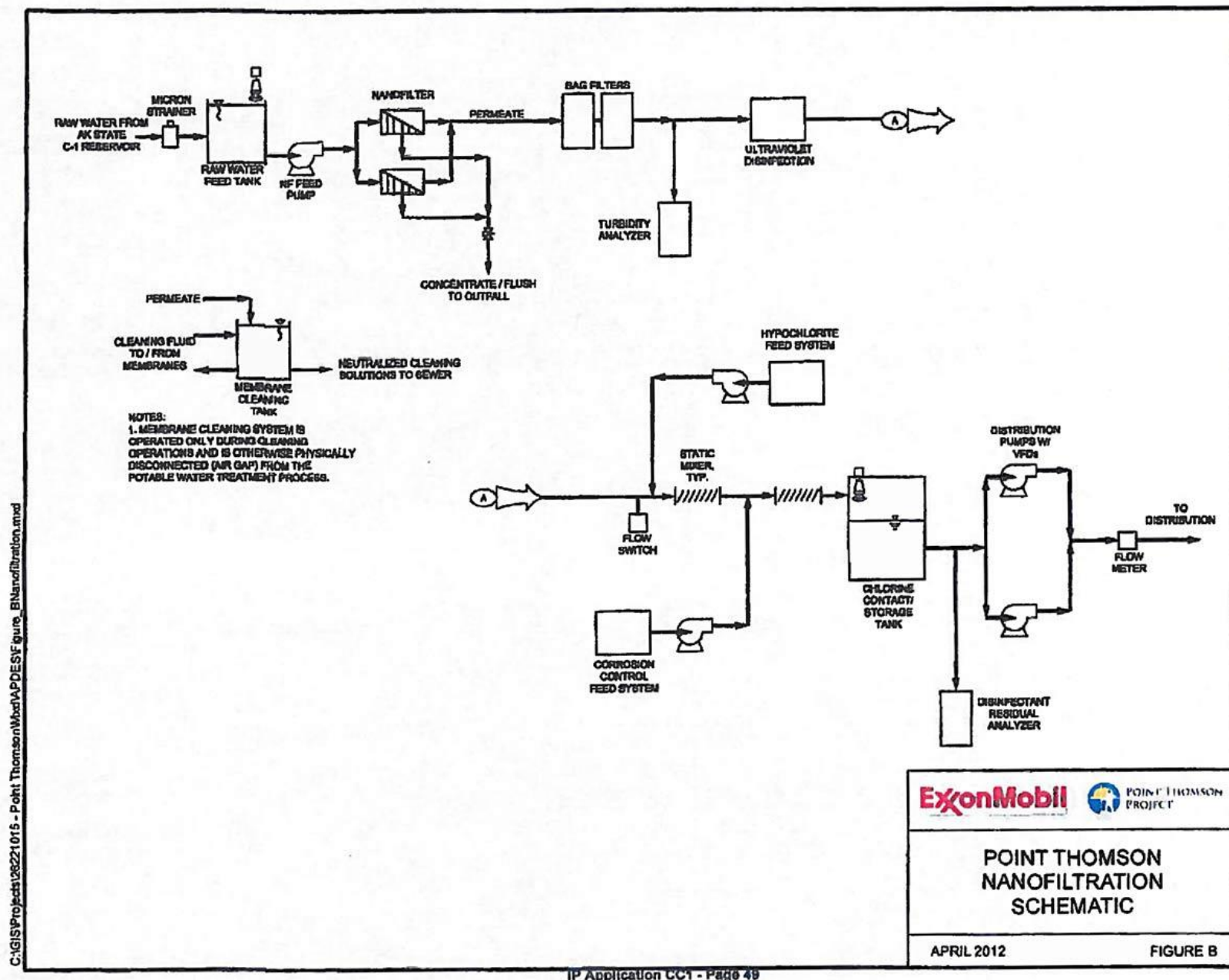
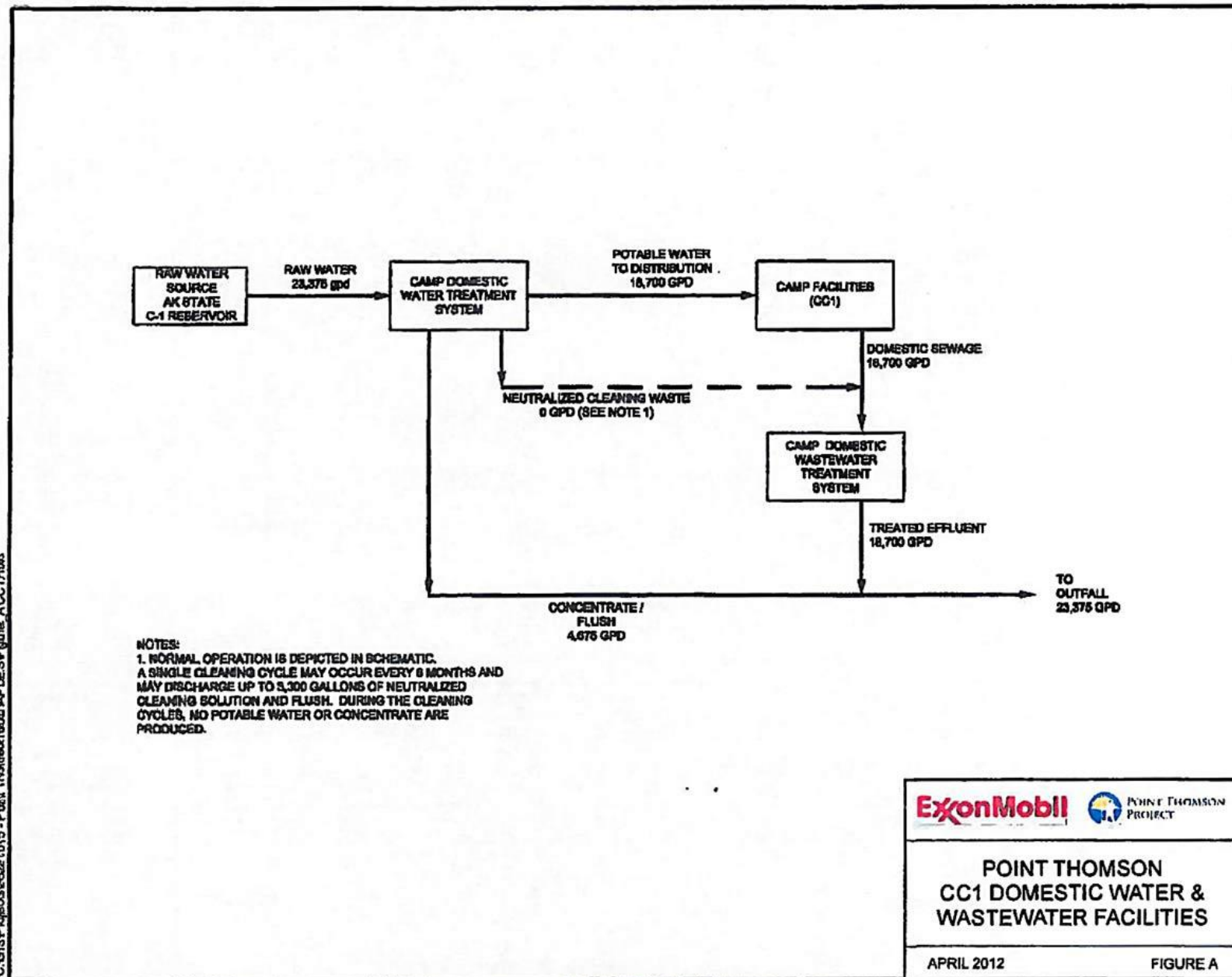


Figure 3: Point Thomson Central Pad - Construction Camp #1 MBR Process Flow Diagram



APPENDIX B. BASIS FOR EFFLUENT LIMITS

In general, the Clean Water Act (CWA) requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBEL) or water quality-based effluent limits (WQBEL). TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the water quality standards (WQS) of a water body are met and may be more stringent than TBELs. Given that no mixing zone has been requested by ExxonMobil Corporation (ExxonMobil) to meet WQS nor authorized by the Alaska Department of Environmental Conservation (DEC or the Department), the water quality criteria for parameters of concern with corresponding WQS will be applied at the end of pipe as the WQBEL. For those pollutants without corresponding WQS, but where the Department has determined a need to limit the discharge due to estimated pollutant make-up, case-by-case TBELs have been developed and exist as the final effluent limit.

B.1 Domestic Wastewater Secondary Treatment Effluent Limits

The CWA requires a Publicly Owned Treatment Works (POTW) to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as “secondary treatment,” that all POTWs were required to meet by July 1, 1977. The Department has adopted the “secondary treatment” effluent limits, which are found in 40 CFR §133.102. The secondary treatment TBELs apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of five-day biological oxygen demand (BOD₅), total suspended solids (TSS), and pH. In addition to the federal secondary treatment regulations in 40 CFR Part 133, the State of Alaska requires maximum daily limits of 60 milligrams per liter (mg/L) for BOD₅ and TSS in its own secondary treatment regulations (18 AAC 72.990).

For this privately owned treatment works, per 40 CFR §125.3(c)(2), the Department is using best professional judgment (BPJ) under Section 402(a)(1) of the CWA to implement case-by-case technology-based secondary treatment requirements for non-POTWs (i.e. privately-owned treatment facilities) authorized to discharge domestic wastewater under this permit. The BPJ requirements are based on the secondary treatment requirements found in 40 CFR §133.102 promulgated specifically for POTWs. While secondary requirements only directly apply to POTWs, the Department is applying secondary treatment standards to privately-owned treatment facilities as they are identical to POTWs in mechanics and treatment efficacy, and accordingly, the secondary standards provide the most meaningful baseline pollutant control guidelines for this sector of privately-owned treatment facilities.

Monthly, weekly, and percent removal BOD₅ and TSS effluent limit requirements, as well as pH minimum and maximum effluent limits, may be found in the federal secondary treatment regulations at 40 CFR Part 133. Additionally, a maximum daily limit (MDL) of 60 mg/L for BOD₅ and TSS are included in the permit (18 AAC 72.900). The technology-based secondary treatment effluent limits applicable to this permitting action, developed through BPJ, are listed in Table B-1.

Table B-1: BPJ - Secondary Treatment Effluent Limits

Parameter	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Range
BOD ₅	30 mg/L	45 mg/L	60 mg/L	—
TSS	30 mg/L	45 mg/L	60 mg/L	—
Removal Rates for BOD ₅ and TSS	85% (minimum)	—	—	—
pH	—	—	—	6.0 – 9.0 s.u.

B.1.1 Chlorine

The ExxonMobil Point Thomson Construction Camp #1 (CC1) tubular membrane bioreactor (MBR) is not anticipated to use chlorine to disinfect wastewater prior to discharge, so a TBEL is not developed as part of this permitting action. However, chlorine is periodically used in a cleaning solution that is back-fed through the MBR. Therefore, chlorine concentrations must meet respective freshwater and marine water quality criteria at the end of pipe prior to discharge.

Some drinking water treatment systems use chlorine in the raw water to prevent biofouling of filters. There are no TBELs for this treatment scenario. The proposed nanofiltration system does not include the use of chlorine for this purpose. Therefore, a chlorine limit is not applied to the discharge of backwash wastewater from the nanofiltration system.

B.1.2 Mass-Based Limitations

The regulation at 18 AAC 83.540 requires that effluent limits be expressed in terms of mass, if possible. The regulation at 18 AAC 83.520 requires that effluent limits for a secondary treatment system be calculated based on the design flow of the facility. Mass-based limits are included in the permit. The mass based limits are expressed in pounds per day and are calculated as follows:

$$\text{Mass based limit (lb/day)} = \text{concentration limit (mg/L)} \times \text{design flow (mgd)} \times 8.341^1$$

B.2 Case-by-Case Technology-Based Effluent Limits Using Best Professional Judgment and Water Quality-Based Effluent Limits for the Industrial Wastewater Stream

Based on the nature of nanofiltration systems, the drinking water source water, and the receiving waters, the Department has determined that TSS, TDS and pH are pollutants of concern for this treatment facility. The Department determined that effluent limits for these parameters are appropriate and have developed them based on WQS codified in 18 AAC 70 and the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances Manual (2008 Alaska Toxics Manual)* as well as case-by-case derived TBELs.

The Environmental Protection Agency (EPA) has not published effluent limitation guidelines for wastewater discharges from drinking water treatment facilities. TBELs for TSS for this permit issuance were developed on a case-by-case basis using BPJ after reviewing other similar permits issued in other states. In addition, and as explained below, a 1987 EPA-funded study (see reference number five) was examined for applicability. This approach is consistent with EPA guidance on developing case-by-case TBELs where information from existing facilities, permits, and literature searches are recommended tools (EPA, 2010). In this instance, data and information were used

¹ 8.341 is a conversion factor with units (lb x L) / (mg x gallon x 10⁶)

from other sources since direct monitoring data for facilities in Alaska were not available. The 1987 EPA study found that 76 percent of water treatment plants surveyed used sedimentation lagoons for wastewater treatment. In these facilities, limits of 30 mg/L and 45 mg/L were representative of the current permitting practice for average monthly and maximum daily TSS limits, respectively. Analysis of actual monitoring data from these facilities showed the 95th percent occurrence (monthly average) and 99th percent occurrence (maximum daily) levels of treatment to be 28.1 mg/L and 44.4 mg/L, respectively.

In addition to the EPA study, DEC examined permits issued in other states where TSS was limited. The average monthly TSS limit was 30 mg/L, and the daily maximum limit ranged from 40 to 60 mg/L. Regulations at 40 CFR § 125.3(c)(2) and 18 AAC 83.425 require that permit writers developing case-by-case effluent limits consider the following: (1) The appropriate technology for the category class of point sources of which the applicant is a member, based on all available information; and (2) any unique factors relating to the applicant. The regulations also require that the permit writer consider several specific factors established in 40 CFR § 125.3(d) to select a model treatment technology and derive effluent limits on the basis of that treatment technology. Using the data and information available for wastewater discharges from similar facilities is consistent with the requirements in 40 CFR § 125.3. Because this is a new permit, existing monitoring data is not available. Therefore, a TSS daily maximum effluent limit of 60 mg/L and a monthly average effluent limit of 30 mg/L have been established, which is consistent with the TSS effluent limits in permits in other states for this type of drinking water facility, as well as the effluent limit proposed in the pending DEC general permit for these types of discharges. Once additional monitoring data is collected during this permit cycle, the effluent limits may be modified based on the new information obtained. The suite of parameters contained in Table 7 of the fact sheet were developed for this purpose.

B.3 Water Quality – Based Effluent Limits

B.3.1 Statutory and Regulatory Basis

18 AAC 70.010 prohibits conduct that causes or contributes to a violation of the WQS. 18 AAC 15.090 requires that permits include terms and conditions to ensure criteria are met, including operating, monitoring, and reporting requirements.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water body. However, this is a new facility such that existing data is not currently available to evaluate effluent or receiving water quality and variability. The applicant anticipates meeting water quality criteria at the end of pipe and did not request a mixing zone. Therefore, the evaluation is based on projected concentrations using estimates from similar treatment systems currently operating on the North Slope and permit writer BPJ.

B.3.2 Reasonable Potential Analysis

A WQBEL must be developed for a parameter if there is reasonable potential for that parameter to exceed or contribute to an exceedance of a WQS. When evaluating the projected effluent to determine if a WQBEL is required for a specific parameter, the numeric water quality criteria are compared to the projected effluent concentrations. In addition, comparison with existing permits from similar treatment facilities is considered to establish consistency within the industry and

other permits. By requiring supplemental data collection for the effluent and receiving water prior to the next permit application, a chemical-specific reasonable potential analysis using representative data can be performed at that time. For this permit, a conservative approach was used to determine potential parameters of concern and their associated water quality criteria found in the WQS in order to develop appropriate QBELs.

B.3.3 Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a QBEL is to develop a wasteload allocation (WLA) for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of WQS or a total maximum daily load in the receiving water body. In cases such as this where a mixing zone is not authorized, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee will not cause or contribute to an exceedance of the criterion.

As previously mentioned, the Department has concluded that in this permitting scenario there is insufficient effluent data to conduct a statistically robust reasonable potential analysis, and has accordingly set the effluent limits as the water quality criteria given there is no dilution allowance afforded through an authorized mixing zone. These limits are protective of both the chronic and acute water quality criteria. The Department has designed an effluent monitoring program with the objective of obtaining a statistically robust dataset during this permit cycle so that the reasonable potential analysis and derivation of QBELs during permit reissuance is based on actual facility performance instead of default values provided by the *Technical Support Document for Water Quality-Based Toxics Control* (TSD) for when little to no actual effluent data exists.

The WQS at 18 AAC 70.020(a) designates classes of water for beneficial uses of water supply; water recreation; and of growth and propagation of fish, shellfish, other aquatic life, and wildlife. The Department has determined, based on limited available information for the receiving water bodies, that all designated classes must be protected and the most stringent water quality criteria among all the classes apply to limit the parameters of concern.

B.3.4 Specific Water Quality-Based Effluent Limits

B.3.4.1 Conventional and Toxic Substances

The WQS for conventional and toxic and other deleterious organic and inorganic substances for freshwater and marine uses are codified in 18 AAC 70.020(a). Chemical-specific criteria for toxic pollutants are further summarized in the Department's, *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*, as amended through December 12, 2008 (Toxics Manual). Parameters of concern and projected effluent concentrations from the permit application were compared with criteria contained in the WQS and Toxics Manual to evaluate appropriate chemical-specific limits. In addition, other existing individual and general permits were used for a consistency review. Based on this evaluation and consistency review, dissolved oxygen (DO), total residual chlorine (TRC), pH, and fecal coliform bacteria (FC) for the MBR discharge and pH and total dissolved solids for the nanofilter are determined to be substances that are determined to be pollutants of concern associated with these types of wastewater streams and require QBEL development.

B.3.4.2 Floating, Suspended or Submerged Matter, including Oil and Grease

The WQS for floating, suspended or submerged matter, including oil and grease, are narrative. The most stringent standard, found at 18 AAC 70.020(b)(8)(A)(i), require that fresh waters, “may not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use; cause a film, sheen, or discoloration on the receiving of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the receiving of the water, within the water column, on the bottom, or upon adjoining shorelines.”

B.3.4.3 pH

The criteria for water supply, aquaculture, water contact recreation, and growth and propagation of fish, shellfish, other aquatic life, and wildlife are the most stringent standards for pH. These standards state that fresh waters, “May not be less than 6.5 or greater than 8.5.” The most stringent standard for marine water is similar to freshwater except the use is associated with water supply for aquaculture as cited per 18 AAC 70.020(b)(18)(A)(i). These WQBEL apply to both the MBR and nanofilter discharges.

B.3.4.4 Dissolved Oxygen

The criteria for agricultural freshwater supply are the most stringent standards for DO. The standards at 18 AAC 70.020(b)(3)(A)(iii) require that “DO must be greater than 7 mg/L in receiving waters; the concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection.” The standards at 18 AAC 70.020(b)(3)(C) require that “DO must be greater than 7 mg/L in waters used by anadromous or resident fish. In no case may DO be less than 5 mg/L to a depth of 20 cm in the interstitial waters of gravel used by anadromous or resident fish for spawning. For waters not used by anadromous or resident fish, DO must be greater than or equal to 5 mg/L. In no case may DO be greater than 17 mg/L. The concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection.”

The most stringent DO standard for marine waters is based on water supply for aquaculture, per 18 AAC 70.020(b)(15)(A)(i). The top one meter of the water column must not be less than 6 mg/L except when natural conditions cause this depression. The DO must not be less than 4 mg/L at any point below the surface and estuaries and tidal tributaries must not be below 5 mg/L. Similar to freshwater, the maximum must be less than 110% of saturation not to exceed 17 mg/L in any case. In summary, freshwater has a minimum of 7 mg/L, marine has a minimum of 6 mg/L, and both have a maximum of 17 mg/L DO.

B.3.4.5 Fecal Coliform Bacteria

The freshwater criteria at 18 AAC 70.020(b)(2) for waters designated for use as water supply for drinking, culinary, and food processing purposes are the most stringent standards for fecal coliform bacteria. The standards require that in a 30-day period, the geometric mean of samples may not exceed 20 fecal coliform units/100 mL, and not more than 10% of the total samples may exceed 40 fecal coliform units/100 mL.

The most stringent marine criteria apply to harvesting for consumption of raw mollusks or other raw aquatic life. Per 18 AAC 70.020(14)(D), the fecal coliform bacteria median most probable number (MPN) may not exceed 14 FC/100 mL and not more than 10% of the

samples may have a median MPN greater than 43 FC/100 mL. These criteria apply only to the MBR discharge to fresh or marine waters.

B.3.4.6 Total Residual Chlorine

The most stringent freshwater criteria for total residual chlorine is found in the Manual and stipulates concentrations may not exceed 19 µg/L for acute aquatic life and 11 µg/L for chronic aquatic life. For marine waters, the criteria are 13 µg/L and 7.5 µg/L for acute and chronic aquatic life, respectively [18AAC 70.020(b)(11)(c)]. These criteria apply only to the MBR discharge to fresh or marine waters.

B.3.4.7 Total Dissolved Solids

The most stringent water quality criteria for TDS is for freshwater supply for drinking, culinary, and food processing, 18 AAC 70.020(b)(4)(A)(i). TDS from all sources may not exceed 500 mg/L and neither chlorides nor sulfates may exceed 250 mg/L. These criteria apply to the nanofilter discharge to freshwater only.

B.3.5 Selection of Most Stringent Limits

B.3.5.1 BOD₅ and Total Suspended Solids

The permit proposes TBELs for BOD₅ and TSS for the MBR discharge. For the nanofilter discharge, the TSS limit is a TBEL using BPJ. The nanofilter does not have a limit for BOD₅.

B.3.5.2 pH

The pH limit between 6.5 Standard Unit (SU) and 8.5 SU are identical to the WQBELs and shall apply at the end-of-pipe for either the MBR or the nanofilter to freshwater or marine water.

Table B-2: Selection of pH Permit Limits

	Minimum Daily (SU)	Maximum Daily (SU)
Technology Based Limits	6.0	9.0
Water Quality-Based Limits	6.5	8.5
Selected Limits	6.5	8.5

B.3.5.3 Fecal Coliform Bacteria

The fecal coliform bacteria WQBEL applies to the MBR discharge. For marine waters, the limits are 14 FC/100 mL not to exceed 43 FC/100 mL more than 10% during one month. For discharges to freshwater, the limit is 20 FC/100 mL not to exceed 40 FC/100 mL more than 10% in a month. The nanofilter does not require a limit for fecal coliform bacteria.

B.3.5.4 Dissolved Oxygen

Both the MBR and nanofilter require WQBELs for DO. For freshwater discharges, each wastewater stream will be limited to 7 mg/L minimum and 17 mg/L maximum DO. For marine water discharges, the minimum will be 6 mg/L and 17 mg/L maximum for both waste streams.

B.3.5.5 Total Residual Chlorine

Although chlorine is not used to disinfect treated wastewater, it is used to periodically clean the membranes. Therefore, a WQBEL is required for MBR discharges to freshwater and marine water. The acute and chronic freshwater limits are 19 µg/L and 11 µg/L TRC, respectively. Whereas, the marine limits are 13 µg/L and 7.5 µg/L TRC, respectively. Based on an understanding that no potable water will be used to backwash the nanofilter, nor will chlorine be injected into the raw water to prevent biofouling, the discharge from the nanofilter does not require a limit for TRC.

APPENDIX C. REASONABLE POTENTIAL DETERMINATION

This is a new facility, and no effluent monitoring data are available to conduct a robust reasonable potential analysis. In such cases, the permitting authority can rely on other factors to determine if the discharge may cause, or contribute to, and excursion above water quality standards. These factors include, but may not be limited to, dilution, industry, type of treatment, existing data from similar facilities, information provided in the application, history of compliance for certain dischargers, and the type of receiving water and designated use. Of these factors, the type of treatment, existing data from similar facilities, information in the application, and the receiving water were pertinent to this specific evaluation. The effluent projected from these treatment facilities is anticipated to meet water quality criteria at the end of pipe. The permit does not authorize a mixing zone. A list of monitoring requirements is included in the permit to support future permit applications to collect the data needed to conduct a robust reasonable potential analysis at the time of reissuance.

APPENDIX D. EFFLUENT LIMIT CALCULATION

Once the Department determines that a pollutant present in the effluent has reasonable potential to exceed a water quality standard, a water quality-based effluent limit for the pollutant is developed. The first step in calculating a permit limit is development of a waste load allocation for the pollutant.

In cases where there is no dilution because the Department does not authorize a mixing zone for a particular pollutant and there is no effluent data to develop limits based on performance of the treatment facility, the criterion may be used as the limit, which is the approach employed for this permit issuance.